

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. After amending the claims as set forth above, claims 1-3 and 5-11 are now pending in this application.

Applicant wishes to thank the Examiner for the careful consideration given to the claims.

Rejection of claim 12 under 35 U.S.C. 112

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Claim 12 has been canceled, which renders the rejection of this claim moot. For at least this reason, favorable reconsideration of the rejection is respectfully requested.

Rejection of claims 1-2, 4-7, 9-11, and 13 under 35 U.S.C. 102

Claims 1-2, 4-7, 9-11, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 09-231990 (“Fuji”). For at least the following reasons, this rejection is traversed.

Claim 1 has been amended to incorporate the subject matter of now canceled claim 4. Claim 1 (as amended) recites “a judgment part judging whether replacement of the ion exchange resin filter is needed based on a comparison between a predetermined reference electric conductivity and an electric conductivity of water circulating in the circulating flow path that is measured by the electric conductivity meter a predetermined time after a start of water circulation, wherein the predetermined time is set on a basis of an initial electric conductivity of water circulating in the circulating flow path.” Fuji does not teach or suggest these features.

The fuel cell system of claim 1 is characterized in that a judgment of whether to replace the ion exchange resin filter is performed in such a way that (i) a predetermined time (for example variable D in Expression (1) on page 4, line 28 of the specification) is set on the basis of an initial electric conductivity ($\sigma_0 = \sigma_0(0)$) of the water circulating in the circulating flow path 1, and (ii) comparing an electric conductivity of the water circulating in the circulating path that is measured after the predetermined time after the start of water circulation with a predetermined (estimated) reference electric conductivity (for example, variable $\sigma_0(n)$) indicated by a circle A in Fig. 3). (Figs. 1-2 of the specification.) An ion-exchange capacity is accurately evaluated by measuring the electric conductivity before the electric conductivity converges to a steady-state value. (Page 6, lines 11-23 of the specification.) Thus, it is possible to judge whether an ion exchange resin filter needs

replacement in advance of the elevation of the electric conductivity of water used in the fuel cell system and prevent the fuel cell from being degraded or damaged. (Page 2, lines 10-13 of the specification).

In contrast, the operational method of the ion exchange water treatment device for a fuel cell of Fuji just monitors a current electric conductivity and judges it is time to replace the ion exchange resin cylinders 27A-27C with new ones when the current electric conductivity exceeds a predetermined level. Using this configuration of Fuji, it is difficult to accurately estimate an ion-exchange capacity of the ion exchange resin filter because the electric conductivity is measured at a time after the electric conductivity converges to a steady-state value. As a result, the system of Fuji is quite different from the system of claim 1.

Furthermore, because the system of Fuji merely measures the current electric conductivity and judges it is time to replace the ion exchange resin cylinders 27A-27C with new ones when the current electric conductivity exceeds a predetermined level, Fuji fails to teach a judgment part judging whether the ion exchange cylinders need replacement based on a comparison between a predetermined reference value and an electric conductivity of water after a predetermined time after a start of water circulation, in which the predetermined time is set on a basis of an initial electric conductivity. The PTO has asserted that “when the certain conductivity level is reached in Fuji, this is the time when the ion exchange material is renewed.” (Paragraph 5 of the Office Action.) It appears that the PTO is asserting that the “predetermined time” is considered “predetermined” because it has been decided before operation that the time for renewing the ion exchange material takes place when the conductivity level exceeds a predetermined level. Even with this interpretation, Fuji does not teach that the predetermined time is set on the basis of an initial electric conductivity. The alleged “predetermined time” of Fuji, at best, would be set merely on the premise that the currently measured electric conductivity is compared to the predetermined level. The initial electric conductivity is not considered at all when setting the “predetermined time” as the term has been interpreted by the PTO.

In relation to claim 4 (whose subject matter has been incorporated into claim 1), the PTO has asserted that the step in claim 4 is inherently met by the teachings of Fuji because the initial electric conductivity in claim 4 is met by the initial electric conductivity in Fuji before the pump therein is started. (Paragraph 5 of the Office Action.) However, claim 1 recites that the predetermined time is set on the basis of an initial electric conductivity, not

just requiring an initial electric conductivity or a measurement thereof. Whether Fuji discloses an initial electric conductivity or not is not sufficient to address all the features of claim 1, because the initial electric conductivity of claim 1 is used as a basis to set the predetermined time, and Fuji does not use the initial electric conductivity in this fashion. Even if the PTO's interpretation that the "predetermined time" is a time that is set in advance of operation in which the judgment comes at a time when the measured electric conductivity passes a predetermined level, this setting of the time is merely a function of the currently measured electrical conductivity and a predetermined threshold, and not based on the initial electric conductivity. Because Fuji does not teach or suggest "wherein the predetermined time is set on a basis of an initial electric conductivity of water circulating in the circulating flow path," claim 1 is not rendered unpatentable over Fuji.

Additionally, claim 1 recites "a judgment part judging whether replacement of the ion exchange resin filter is needed based on a comparison between a predetermined reference electric conductivity and an electric conductivity of water circulating in the circulating flow path that is measured by the electric conductivity meter a predetermined time after a start of water circulation." According to the PTO, the "predetermined time" is considered to be the time of Fuji in which the electrical conductivity exceeds a predetermined fixed level. However, this interpretation is incorrect because at the so-called "predetermined time" of Fuji in which the electrical conductivity exceeds a predetermined fixed level, the judging part does not judge whether replacement of the ion exchange resin filter is needed (which implies that it can be judged that it may not be needed), but judges that replacement of the ion exchange resin filter must take place. Thus, a different function is occurring at the "predetermined time" of Fuji as interpreted by the PTO (i.e., judging that replacement must take place) and the "predetermined time" of claim 1 (i.e., judging whether or not replacement must take place). Because Fuji does not teach or suggest a judgment part judging whether or not replacement must take place at the predetermined time, Fuji does not teach or suggest all the features of claim 1.

Claims 2, 5-7, and 11 depend from and contain all the features of claim 1, and are allowable therewith for at least the same reasons as claim 1, without regard to the further patentable features contained therein.

Claims 4 and 13 are canceled, which renders the rejection of these claims moot.

Claim 9 (as amended) recites "determining a predetermined time for measuring the electric conductivity of water on a basis of an initial electric conductivity of water circulating

in the circulating flow path; and judging whether the ion exchange resin filter needs replacement based on a comparison between a predetermined reference and an electric conductivity of water circulating in the circulating flow path as measured by the electric conductivity meter the predetermined time after the start of water circulation.” As previously mentioned, Fuji does not teach or suggest determining the predetermined time on a basis of an initial electric conductivity of water circulating in the circulating flow path or judging whether or not replacement of the ion exchanger filter must take place at the predetermined time. Accordingly, Fuji does not teach or suggest all the features of claim 9.

Claim 10 (as amended) recites “a judging means for judging whether the ion exchange means needs replacement based on a comparison between a predetermined reference and an electric conductivity of water circulating in the circulating flow path as measured by the electric conductivity means a predetermined time after a start of water circulation, wherein the predetermined time is set on a basis of an initial electric conductivity of water circulating in the circulating flow path.” As previously mentioned, Fuji does not teach or suggest setting the predetermined time on a basis of an initial electric conductivity of water circulating in the circulating flow path or judging whether or not replacement of the ion exchanger means must take place at the predetermined time. Accordingly, Fuji does not teach or suggest all the features of claim 10.

For at least these reasons, favorable reconsideration of the rejection is respectfully requested.

Rejection of claim 8 under 35 U.S.C. 103

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fuji in view of U.S. Patent Application Publication 2004/0028963 (“Kormann”). The rejection is traversed for at least the following reasons.

Claim 8 depends from and contains all the features of claim 1. As previously mentioned, Fuji does not teach or suggest “wherein the predetermined time is set on a basis of an initial electric conductivity of water circulating in the circulating flow path” or a judgment part that judges whether or not replacement of the ion exchange filter must take place at the predetermined time. Kormann does not cure these deficiencies.

Kormann discloses a device for deionizing cooling media for a fuel cell in which a direct voltage is supplied onto the electrodes of an electrode ionization cell 23 under the switching of a conductivity sensor 24 in order to reduce the electric conductivity in the

cooling circuit 20 arranged downstream of the heat exchanger 22. The PTO alleges that Kormann teaches a predetermined time for changing an ion exchange filter in a fuel cell system after a certain operation time. (Paragraph 7 of the Office Action.) Kormann does not provide such a teaching, and Applicant requests that the PTO provide the basis for this statement by specifying the related statements or passages in Kormann.

Furthermore, the rejection based on Fuji and Kormann is improper because there is no reason to combination the teachings of these references. The PTO merely asserts that “[i]t would have been obvious...to have utilized a predetermined time as a number of flow path trips in the system of Fuji because of the teachings of Kormann that disclose a predetermined time according to the passage of a certain amount of time.” (Paragraph 7 of the Office Action.) In effect, the PTO is asserting that it is obvious to use the teachings of Kormann merely because it teaches “a predetermined time according to the passage of a certain amount of time.” This statement does not address whether Kormann teaches a predetermined time that is “set to a period in which the water...circulates through the circulating flow path for a predetermined number of times” as required by claim 8. Also, the mere existence of elements from different references is not sufficient to combine the elements into one device. Indeed, the Supreme Court in the *KSR Int’l Co. v. Teleflex, Inc.*,” 127 S.Ct. 1727 (U.S. 2007), recently clarified the standards for obviousness in which the Court stated that “a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the art...it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant filed to combine the elements in the way the claimed new invention does.” *KSR* at 1741. In addition, the Court in *KSR* stated that a reason to combine elements should be made explicit. *Id.* at 1740-41.¹ Indeed, the Court approvingly cited *In re Kahn*, 441 F.3d 977 (Fed. Cir. 2006), for requiring an articulated reason. *Id.* at 1741.² In this case, no articulated reason for proposing the combination has been provided at all. Accordingly, any combination of Fuji and Kormann is improper, and the rejection should be withdrawn.

¹ “Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit.” *Id.* at 1740-41.

² “Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness” *Id.* at 1741.

For at least these reasons, favorable reconsideration of the rejection is respectfully requested.

Conclusion

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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